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AUTHOR Smith, Douglas K.; Lyon, Mark A.
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ABSTRACT

A study sought to compare the performance of elementary school students referred for learning difficulties on the Kaufman Assessment Battery for Children (K-ABC) and the Wechsler Intelligence Scale for Children-Revised (WISC-R) and to examine similarities and differences in performance on the two instruments between those placed in learning-disabled (LD) programs and those not placed. Of the 133 students, ages 6 to 12, administered the test, 82 were subsequently placed in LD programs. K-ABC scores were slightly lower than WISC-R scores for both groups. Correlations among the global scales of both instruments were all significant. Students placed in LD programs demonstrated lower scores on the Achievement Scale of the K-ABC and the Arithmetic and Reading/Decoding subtests as compared to the students not placed in the LD programs. Although the school-identified LD students revealed a greater variability in mean global scores, subtest profiles for both groups of students were remarkably similar. (CB)

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Children with Learning Difficulties: Similarities and Differences in Cognitive Abilities and Achievement

Douglas K. Smith and Mark A. Lyon

Department of Psychology

University of Wisconsin-River Falls

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Paper presented at Annual Meeting of American Educational Research Association, Washington, DC, April 1987.

Running head: CHILDREN WITH LEARNING DIFFICULTIES

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Abstract

The K-ABC and WISC-R were administered in counterbalanced order to 133 students (92 males and 41 females) newly referred for the assessment of learning problems with 82 students subsequently placed in LD programs. Correlations among the global scales of both instruments were all significant ($p < .001$). Students placed in LD programs demonstrated lower mean scores on the Achievement Scale of the K-ABC and the Arithmetic and Reading/Decoding subtests as compared to the students not placed in LD programs. Although the school-identified LD students revealed a greater variability in mean global scores, subtest profiles for both groups of students were remarkably similar.

The diagnosis of learning disabilities (LD) in children continues to be a controversial issue, as criteria for LD placement vary widely and school districts employ a diversity of identification procedures (Ysseldyke, Algozzine & Epps, 1983). Although criteria for placement in LD programs are not consistent, many districts utilize a discrepancy model based on differences between the child's ability, as measured by an individual intelligence test, and achievement.

Numerous studies have attempted to identify differences between LD and non-LD students as well as characteristic profiles of the LD student, with mixed and often times contradictory results being reported. Some studies (e.g. Algozzine & Ysseldyke, 1983) report no differences between students identified as LD and low achieving students, while other researchers (e.g. Kaufman, 1979) report characteristic patterns of performance on the Wechsler Intelligence Scale for Children-Revised (WISC-R). A recent meta-analysis of 94 such studies using the Wechsler Scales concluded that "no recategorization, profile, factor cluster, or pattern showed a significant difference between learning disabled and normal samples" (Kavale & Forness, 1984, p. 136). The majority of these studies, however, have been characterized by small samples, use of previously identified LD students, lack of control groups, failure to control for length of time in LD program, or failure to consider severity of the handicap.

Since the introduction of the Kaufman Assessment Battery for

Children (K-ABC; A. Kaufman & N. Kaufman, 1983), additional studies of LD students have been conducted. The authors of the K-ABC define intelligence as "an individual's style of solving problems and processing information" (A. Kaufman & N. Kaufman, 1983, p. 2) and assert that "low levels of sequential or successive processing may be associated with poor reading performance for mentally retarded and learning disabled children" (A. Kaufman & N. Kaufman, 1983, p. 11).

Validity studies in the Interpretive Manual of the K-ABC indicated that LD students obtained Simultaneous (SIM) processing standard scores approximately 2-5 points higher than Sequential (SEQ) processing scores. Several of the studies also found equal proportions of SEQ > SIM and SIM > SEQ patterns among the students.

Recent studies examining LD students' performance on the K-ABC and other measures (Haddad, 1984, April; Klanderman, Perney & Kroeschell, 1985; Naglieri, 1984, April, 1985; Naglieri & Haddad, 1984; A. Obrzut, J. Obrzut & Shaw, 1984) have documented a strong relationship between the Mental Processing Composite (MPC) on the K-ABC and the Full Scale IQ (FSIQ) on the WISC-R (r = .71 to .85). Most of the studies have also failed to find consistent SEQ-SIM processing differences for LD students as a group. In addition, the ACH standard score has usually been 4-10 points lower than the MPC for LD students. Recent critiques of the K-ABC factor structure (Bracken, 1985; Keith, 1985), however, have questioned the legitimacy of interpreting the entire cluster of ACH subtests

as a distinct factor. In fact, Kaufman (1983) described several achievement subtests (Riddles, Expressive Vocabulary, Faces & Places and Arithmetic) as being similar to verbal measures on other tests and Keith (1985) indicated that at age levels 5 and 7 achievement subtests did not load on a separate factor. These issues, however, have usually been examined using previously identified LD students or students without academic difficulties.

Therefore, the purposes of the present study were: (1) to compare K-ABC and WISC-R performance for a sample of elementary-age students referred for learning difficulties and (2) to examine similarities and differences in performance on the two instruments between those students placed in LD programs and those not placed.

Method

Subjects

The sample consisted of 133 students (92 males and 41 females) who were newly referred for the assessment of learning problems. (Eighty-two students were subsequently placed in LD programs). The students ranged in age from 6 years, 0 months to 12 years, 5 months with an average age of 8 years, 3 months. Grade levels ranged from one to six.

Procedure

Each student was administered the K-ABC and WISC-R in counterbalanced order by school psychologists employed by the school district. Eighty-two students (62%) were subsequently placed in LD programs, 48 students (36%) were not placed in special

programs, and the status of three students (2%) was not reported.

Results and Discussion

Consistent with studies reported in the Interpretive Manual, K-ABC scores were slightly lower than WISC-R scores for both groups, with a difference between the mean MPC and FSIQ of 2.57 for the LD group and 1.80 for the non-LD group. The lowest mean score for both groups was ACH, which fell into the low average range for the LD group and at the lower end of the average range for the non-LD group. Mean scores, standard deviations and range are reported for the K-ABC and WISC-R global scales in Table 1.

Insert Table 1 about here

K-ABC/WISC-R intercorrelations are presented in Table 2. Due to a restriction in range on the K-ABC, the correlations were corrected using Guilford's (1954) formula.

Insert Table 2 about here

All correlations were significant ($p < .001$), with the MPC-FSIQ and ACH-FSIQ correlations both at .80, suggesting that both the achievement and mental processing scales relate strongly to the WISC-R. Substantial overlap in the constructs measured by the two instruments is indicated. The SEQ scale correlations with the WISC-R scales were considerably lower than the SIM

correlations, a pattern previously found by Klanderman et al. (1985) in a study of 44 LD students.

Correlations between individual subtests and the global scales were calculated for each instrument. On the K-ABC, simultaneous subtests correlated most highly with the SIM scale (.55 to .86), sequential subtests correlated most highly with the SEQ scale (.73 to .92) and achievement subtests correlated most highly with the ACH scale (.79 to .86). Subtest correlations with the MPC ranged from .40 to .82. On the WISC-R, verbal subtests correlated most highly with the Verbal scale (.43 to .86), performance subtest correlations with the Performance scale ranged from .29 to .80 with four subtests (Picture Completion, Block Design, Object Assembly and Coding) producing higher correlations with the FSIQ. Subtest correlations with the FSIQ ranged from .41 to .78. Thus, the skills measured by the Performance scale are not as distinct from overall mental functioning as the skills measured by the Verbal scale. Of interest are the nearly identical range of correlations among subtests of the K-ABC with the MPC and subtests of the WISC-R with the FSIQ.

In order to ascertain significant differences in performance patterns between students placed in LD programs and those not placed, a series of 2 by 2 analyses of variance were conducted with global standard scores and subtest scaled scores on the K-ABC and WISC-R as dependent variables and placement and sex as independent variables. Significant main effects for placement were found on

the ACH scale (F (1, 106) = 8.15, $p < .005$) and on the subtests, Arithmetic (F (1, 106) = 14.74, $p < .001$) and Reading/Decoding (F (1, 106) = 14.20, $p < .001$). Students placed in LD programs demonstrated lower mean scores than students not placed in LD programs in all three instances. No other significant main effects or interaction effects were obtained.

Since many LD programs base placement decisions on the discrepancy between ability and achievement and differences in ability between the two groups was nonsignificant, it is not surprising that the students placed in LD programs exhibited significantly lower ACH scores. The pattern of performance on the global scales by both groups is depicted in Figure 1.

Insert Figure 1 about here

Comparisons of subtest profiles for the K-ABC and WISC-R by group (LD, non-LD) are presented in Figures 2, 3 and 4. These patterns are remarkably similar for both groups. Highest K-ABC subtest scores for both groups were Gestalt Closure and Matrix Analogies. Spatial Memory and Photo Series were the lowest subtest scores for the non-LD group and Hand Movements and Number Recall the lowest subtest scores for the LD group. The WISC-R results were similar with highest and lowest verbal subtest scores for both groups being Similarities and Comprehension along with Information and Digit Span, respectively. On the performance

scale, the highest subtest scores were Picture Arrangement and Mazes for the non-LD group and Picture Completion and Picture Arrangement for the LD group. Block Design and Coding were the lowest performance subtest scores for both groups. Very similar profiles between the two groups are presented with differences only in level of score and this difference is only significant in the achievement area.

For this sample of students with learning difficulties, the achievement subtests of the K-ABC may not be measuring a unitary trait (see Bracken, 1985; Keith, 1985). Both groups performed at a lower level on Reading/Decoding, Reading/Understanding and Arithmetic as compared to Faces & Places and Riddles. Since all five subtests are on the same scale, the ACH scale may provide higher achievement scores, especially for students placed in LD programs, than their performance in reading or arithmetic would indicate.

Insert Figure 2 about here

Insert Figure 3 about here

Insert Figure 4 about here

Global scale performance patterns (i.e. SEQ > SIM) for the K-ABC and WISC-R are presented by group in Table 3. Chi-square analysis of these data indicated no significant difference between groups for either the K-ABC or WISC-R. It is of interest that the majority of students (both LD and non-LD) displayed equally developed SIM and SEQ processing skills along with equally developed verbal and performance skills. Of the students who displayed a preference, the vast majority were SEQ < SIM and VIQ < PIQ for the LD group and a near equal split for the non-LD group. These results are strongly suggestive of an absence of a characteristic processing pattern for school identified LD students as compared to other students with learning difficulties.

Insert Table 3 about here

Of the 67 LD students with complete scores on the K-ABC and WISC-R, 16 (24%) exhibited significant differences in processing style on the K-ABC and verbal/performance abilities on the WISC-R while 31 (46%) displayed significant differences between global scales on only one of the instruments and 20 (30%) displayed no significant differences on either test. For the 41 non-LD students, a similar pattern emerged with the frequencies being 3

(7%), 24 (59%) and 14 (34%), respectively.

In order to determine if significant differences among global scores existed within each group (LD, non-LD), t-tests for related samples were performed. For the LD group, significant differences on the K-ABC were obtained for SEQ-SIM ($t(75) = 3.89$, $p < .001$) and MPC-ACH ($t(66) = 4.40$, $p < .001$) with the mean SEQ score significantly lower than the mean SIM score and the mean ACH score significantly lower than the mean MPC. On the WISC-R, significant differences were found for VIQ-FSIQ ($t(71) = 3.49$, $p < .001$), PIQ-FSIQ ($t(70) = 4.36$, $p < .001$) and VIQ-PIQ ($t(70) = 3.96$, $p < .001$). The verbal mean was significantly lower than the FSIQ and PIQ and the performance mean was significantly higher than the FSIQ. For the non-LD group, no significant differences were obtained on either the K-ABC or WISC-R.

As a group the LD students demonstrated greater variability in global scores on both the WISC-R and K-ABC. Their patterns were characterized by: SIM scores higher than SEQ scores, MPC higher than ACH, PIQ higher than VIQ and FSIQ, and FSIQ higher than ACH. At the same time, the non-LD group displayed a more consistent pattern of scores with no significant differences among the global scales of the WISC-R and K-ABC. These results might lead one to conclude that the performance of the two groups is quite different. However, a comparison of subtest performance leads to the opposite conclusion. The pattern of performance in Figures 2 and 3 is nearly identical for the two groups with the difference being one

of degree and not kind. Statistically significant differences are indicated on only two subtests (Arithmetic and Reading/Decoding). The global scores, which reflect the mean performance in each area appear to camouflage actual subtest performance.

These results may explain the conflicting research in the literature. Studies examining only global scale differences between school-identified LD students and non-LD students may find significant differences which occur as the result of the cumulative effect of subtest differences, which individually are not statistically significant. Studies examining subtest differences between the two groups, however, may not find significant differences as the pattern of subtest scores is very similar for both groups of students. Thus, the results of the present study emphasize the need to examine not only global scale performance but also subtest performance.

In summary the two groups of students differed from each other on the ACH scale of the K-ABC as a result of lower performance on Arithmetic and Reading/Decoding by the students identified as LD. No other significant differences were indicated. As compared to the non-LD group, the school identified LD students displayed greater variability in global scores with SIM < SEQ, VIQ < PIQ, FSIQ < PIQ, ACH < MPC and ACH < FSIQ. The pattern of subtest scores, however, was similar with LD students showing a somewhat greater range in scores.

Conclusions

The observed differences on the global scales of the WISC-R and K-ABC between students placed and not placed in LD programs are consistent with previous research and seem to reflect the lesser developed academic skills of these students. Lower levels of sequential processing and lower achievement scores, especially in reading, were evident in the LD students. Both groups exhibited lower achievement scores than ability scores with significant differences for the LD group only. At the same time, the global scores appear to mask the great similarity in pattern of performance for both groups of students as shown by the subtest scores in which only Arithmetic and Reading/Decoding represent significant departures between the two groups.

It appears that the major criterion for placement in LD programs is the ability-achievement discrepancy rather than other criteria, such as learning style. The non-LD group displayed a more even global scale profile with mean scores ranging from 90.76 to 94.00 while the LD group displayed a more variable pattern with mean scores ranging from 84.37 to 97.27. Subtest profiles, however, were very similar for both groups with the difference between those placed in LD programs and those not placed being one of magnitude of scores.

The key difference between those students placed in LD programs and those not placed was the ACH score (specifically, reading and arithmetic performance). Style of learning, as

measured by the mental processing subtests of the K-ABC, and abilities, as measured by the WISC-R, were very similar for both groups. These results strengthen the conclusion that minimal differences exist between school-identified LD students and other students with learning difficulties. Indeed those differences were in the achievement area with students placed in LD exhibiting greater achievement deficits than those not placed in LD programs.

These results suggest that both groups of students would benefit from similar kinds of academic interventions. Only those students placed in LD programs, however, are eligible for special services, while the non-placed students, exhibiting learning patterns that are not significantly different from the LD students, are not eligible for those services. The need, however, remains the same as both groups of students were referred on the basis of academic difficulties. The challenge is to provide appropriate intervention to the nonplaced students via the regular classroom. Consulting with classroom teachers, inservice workshops and teacher assistance teams are examples of delivery systems that could be used to assist the classroom teacher in meeting the needs of the non-placed students.

In both groups (LD and non-LD) the majority of students displayed no processing preference, and yet, some students displayed significant strengths on the SIM scale or SEQ scale. Likewise, some students demonstrated strengths in verbal areas or nonverbal areas, while the majority revealed equally developed

skills. Thus, a characteristic "LD profile" was not indicated. Consequently, intervention approaches must be carefully tailored to the individual needs of the student. Some students, but not all, may benefit from a very structured, sequential approach to presenting new material, whereas other students may benefit from an approach that emphasizes their strengths in nonverbal, spatial areas.

Correlations among the global scales of both instruments were all significant ($p < .001$) and suggest substantial overlap between the two instruments. The results of this study support the validity of both instruments with students with learning difficulties and, more importantly, emphasize the need to look beyond global scale means in comparing the performance of various groups of students, especially those with learning difficulties.

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Table 1

Means, Standard Deviations and Minimum/Maximum Values for the Global Scales of the K-ABC and WISC-R by Group

Variable	Mean	Standard Deviation	Range
Mental Processing Composite			
Learning Disabled	90.40	12.15	76-116
Non-Learning Disabled	91.48	10.48	66-116
Simultaneous Processing			
Learning Disabled	93.78	12.65	76-121
Non-Learning Disabled	92.54	10.96	64-120
Sequential Processing			
Learning Disabled	88.19	12.14	81-122
Non-Learning Disabled	92.19	12.43	69-131
Achievement			
Learning Disabled	84.37	10.59	68-108
Non-Learning Disabled	90.76	10.30	59-125
Full Scale IQ			
Learning Disabled	92.96	15.53	72-126
Non-Learning Disabled	93.28	14.72	61-124
Verbal IQ			
Learning Disabled	89.04	16.44	81-125
Non-Learning Disabled	93.73	15.46	65-130
Performance IQ			
Learning Disabled	97.27	15.83	71-135
Non-Learning Disabled	94.00	13.45	64-123

Table 2

Correlations Among the Global Scales of the K-ABC and WISC-R

Variable	SEQ	SIM	ACH	FSIQ	VIQ	PIQ
MPC	.78(.85)	.90(.94)	.55(.67)	.71(.80)	.58(.68)	.69(.78)
SEQ		.43(.50)	.45(.57)	.44(.51)	.41(.48)	.37(.44)
SIM			.50(.62)	.70(.77)	.54(.63)	.72(.90)
ACH				.70(.80)	.76(.85)	.47(.60)
FSIQ					.90	.86
VIQ						.57

Correlation coefficients reported in parentheses are corrected for restriction in range via Guilford's formula (Guilford, 1954)

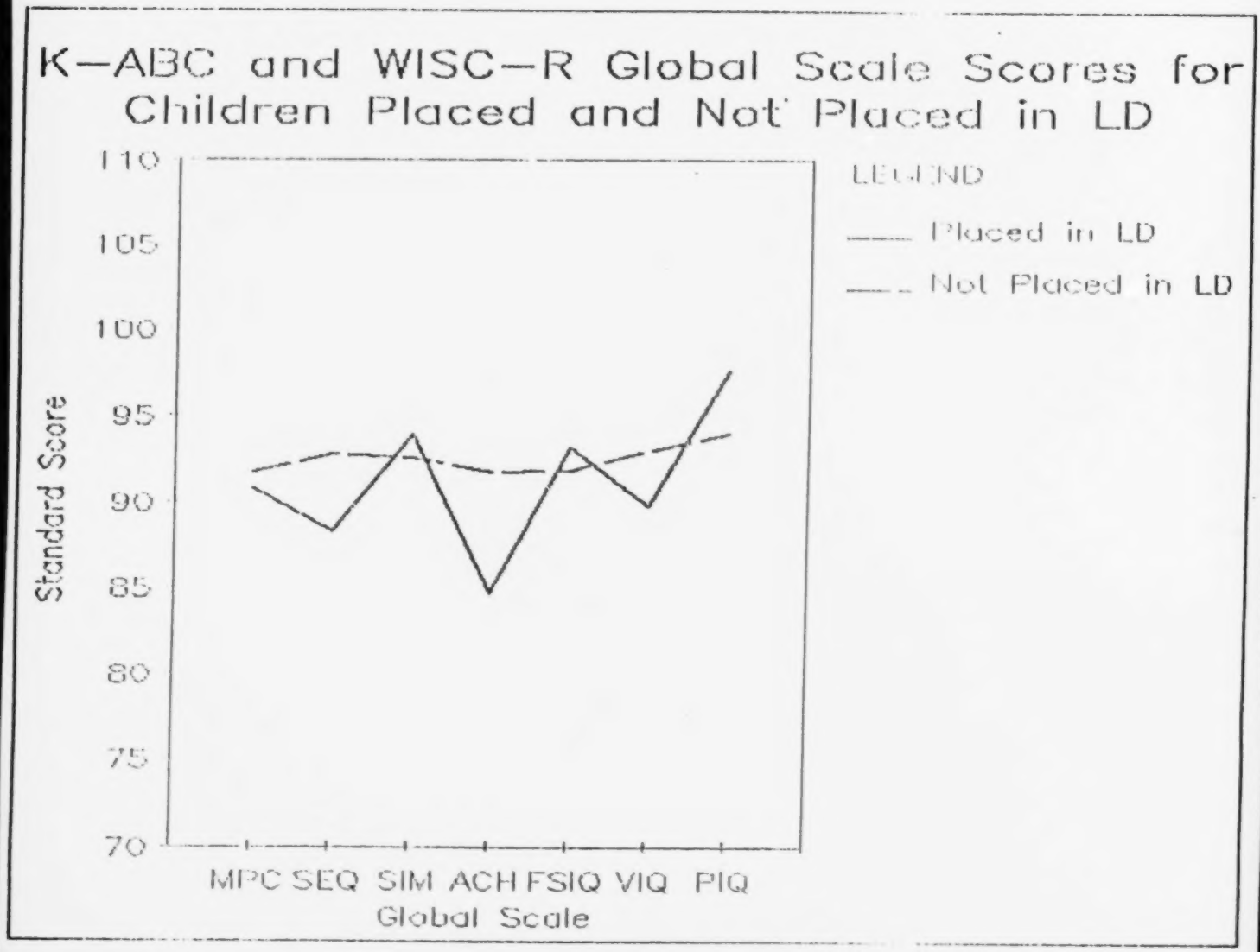
All correlation coefficients are significant ($p < .001$).

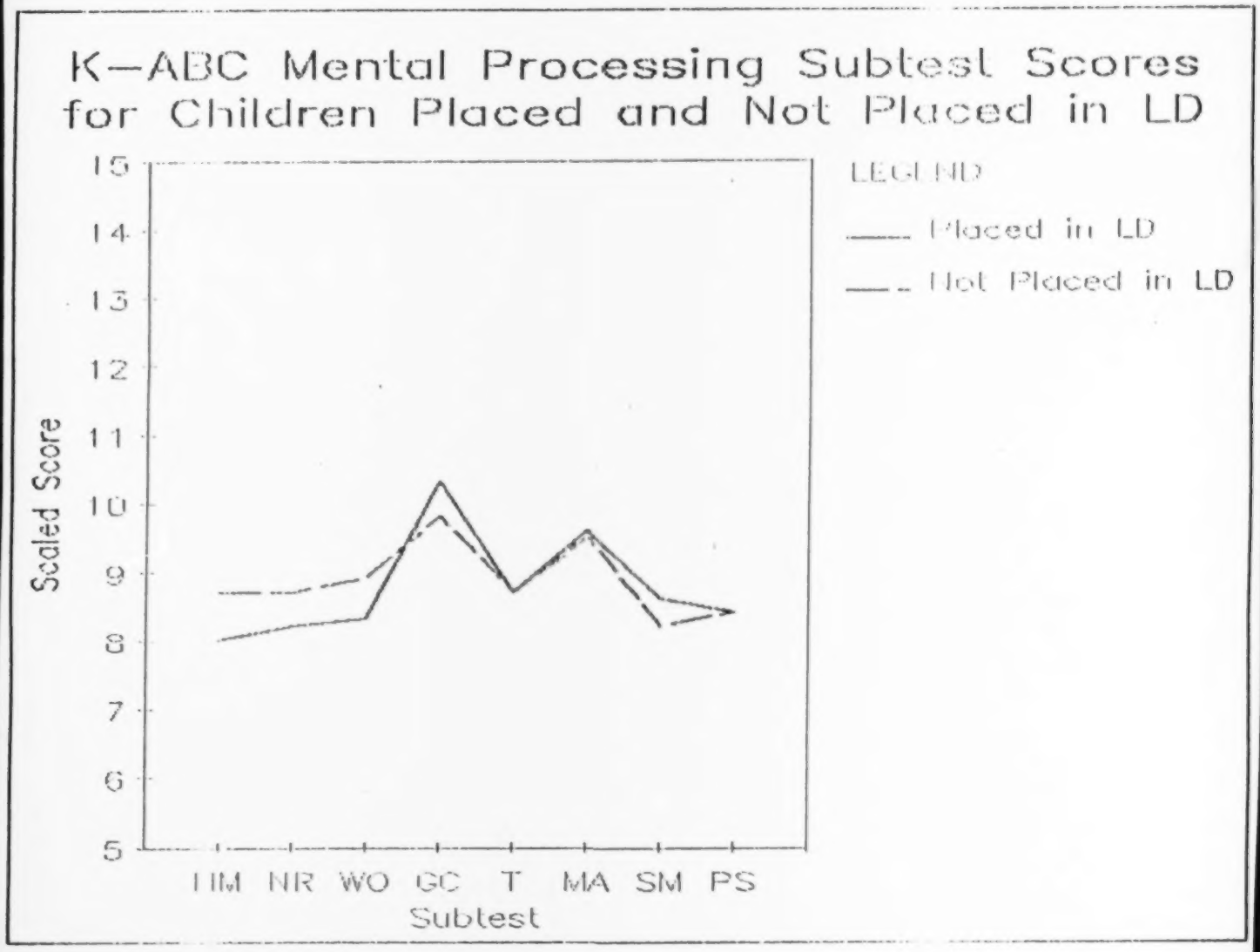
Table 3

Global Scale Performance Patterns on the K-ABC and WISC-R by Group

Global Pattern	LD	non-LD
K-ABC		
Sequential > Simultaneous	7 (9%)	8 (17%)
Sequential < Simultaneous	26 (33%)	7 (15%)
Sequential = Simultaneous	45 (58%)	31 (68%)
WISC-R		
Verbal IQ > Performance IQ	8 (11%)	8 (19%)
Verbal IQ < Performance IQ	28 (38%)	8 (19%)
Verbal IQ = Performance IQ	37 (51%)	27 (62%)

Note: Percentage is by group (LD, non-LD)


K–ABC and WISC–R Global Scale Scores for Children Placed and Not Placed in LD
110
105
100
95
90
85
80
75
70
Standard Score
LEGEND
Placed in LD
Not Placed in LD
MPC SEQ SIM ACH FSIQ VIQ PIQ
Global Scale


K—ABC Mental Processing Subtest Scores
for Children Placed and Not Placed in LD
15
14
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Scaled Score
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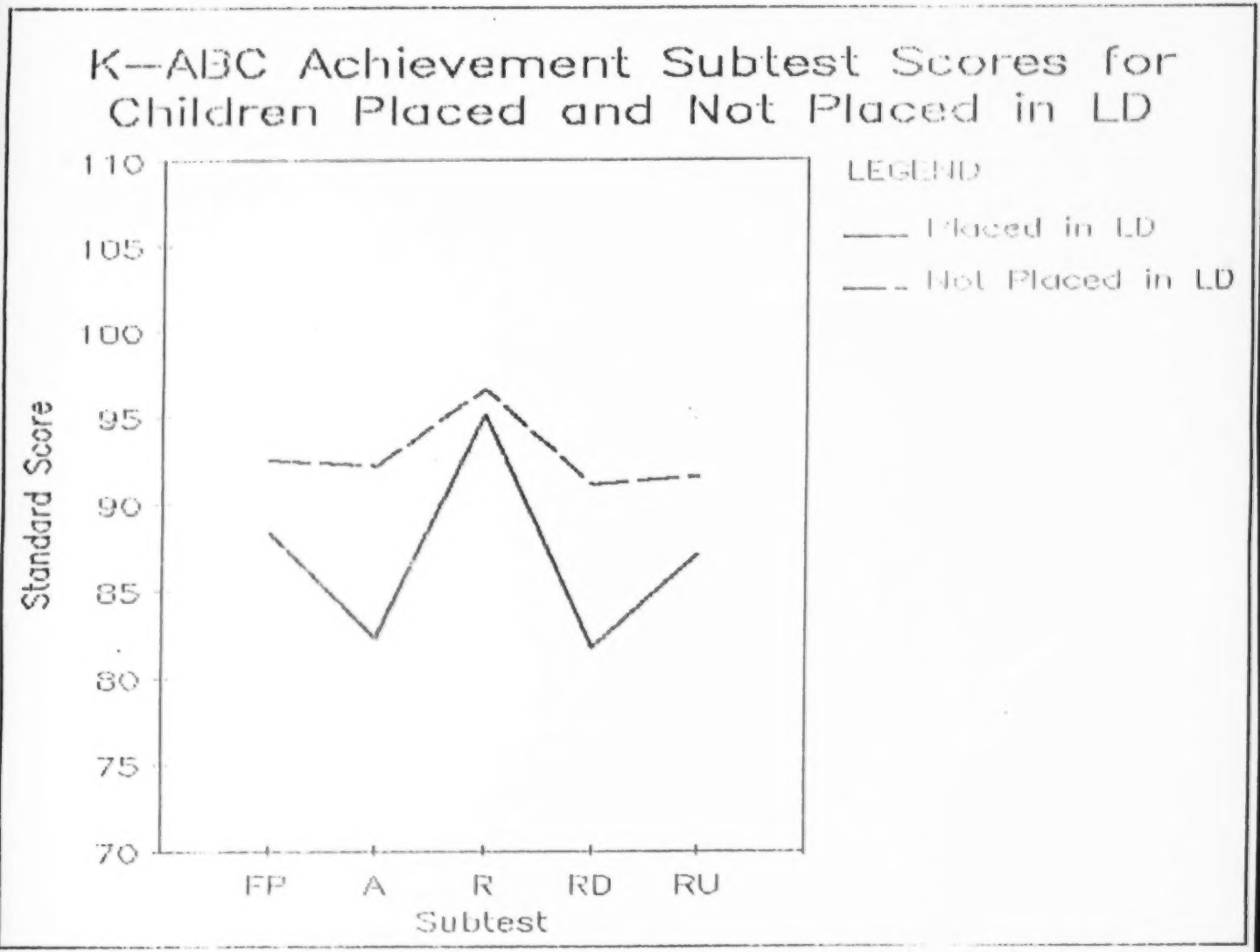
Subtest
LEGEND
Placed in LD
Not Placed in LD


K–ABC Achievement Subtest Scores for Children Placed and Not Placed in LD
LEGEND
Placed in LD
Not Placed in LD
Standard Score
110
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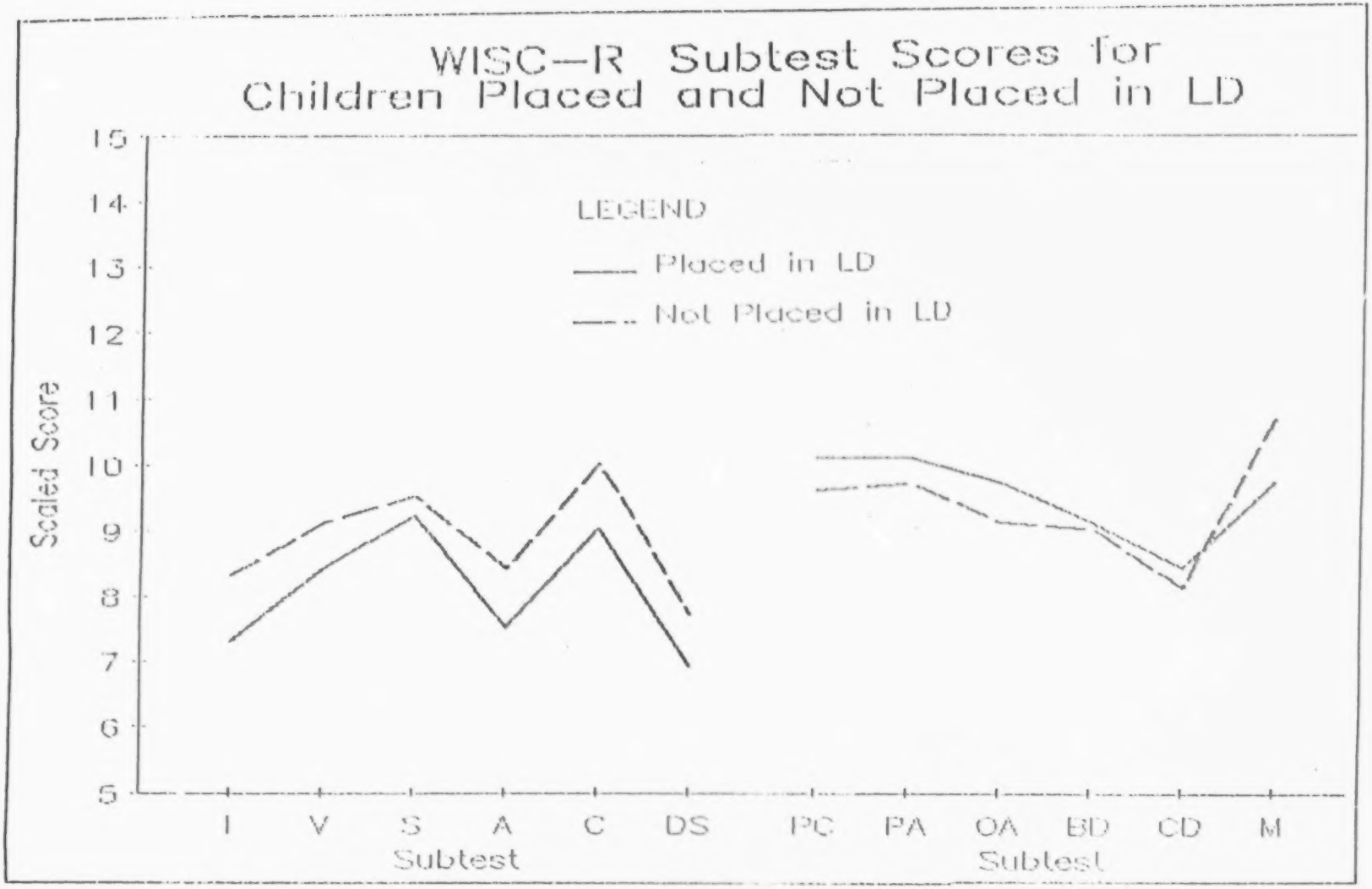
WISC–R Subtest Scores for
Children Placed and Not Placed in LD
LEGEND
Placed in LD
Not Placed in LD
Scaled Score
15
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